

Novel polymer shelled microballoons for diagnostic and therapeutic purposes: new outcomes from the European Project S.I.G.H.T.

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Microbubbles are well known ultrasound contrast agent already available in the market. The relevancy of such devices is directly linked to the widespread use of echography as diagnostic tool. On this basis, we have designed a new concept of polymer shelled multifunctional microballoons entailing features as: long term chemical and physical stability, narrow size distribution, easy modification of the surface.

The structural characterization of these MBs was carried out by confocal laser scanning microscopy (CLSM) and STXM (soft X-ray microscopy), see Figure 1 and 2.^{1,2} Loading capability of this device with different therapeutic gasses³ will be presented. Ligand coating for targeting the device to the tumour cells has been achieved by MBs surface conjugation with hyaluronic acid (a ligand for CD44 receptor) and with galactosyl - chitosan (a ligand for asialoglycoprotein receptor expressed by hepatocarcinoma cells).

Interactions of the device with cells will be also highlighted as well as response to insonification. These results are the fall outs of the on going activity of the **European project SIGHT** "Systems for *in-situ* theranostics using micro-particles triggered by ultrasound" (web site: www.sight4health.eu), a consortium of 10 partners including research institutions and companies, started in September 2006.

References

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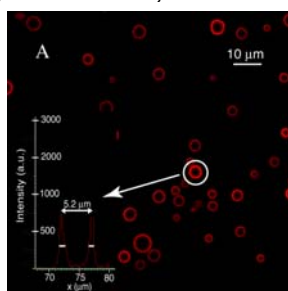


Figure 1 – CLSM image of PVA MBs



Figure 2 - Soft X-ray microscopy of PVA MBs. Cover of *Soft Matter* (ref 2)

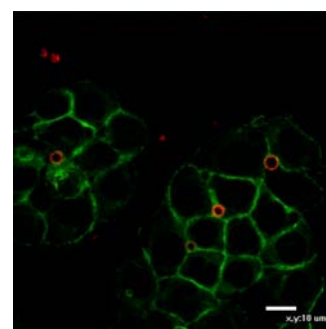


Figure 3 - CLSM image: Bioadhesion of MBs (red, RBITC labelling) on HT 29 cells HT 29 cells (green, phalloidine staining of cytoskeleton)

Preferred presentation: Oral